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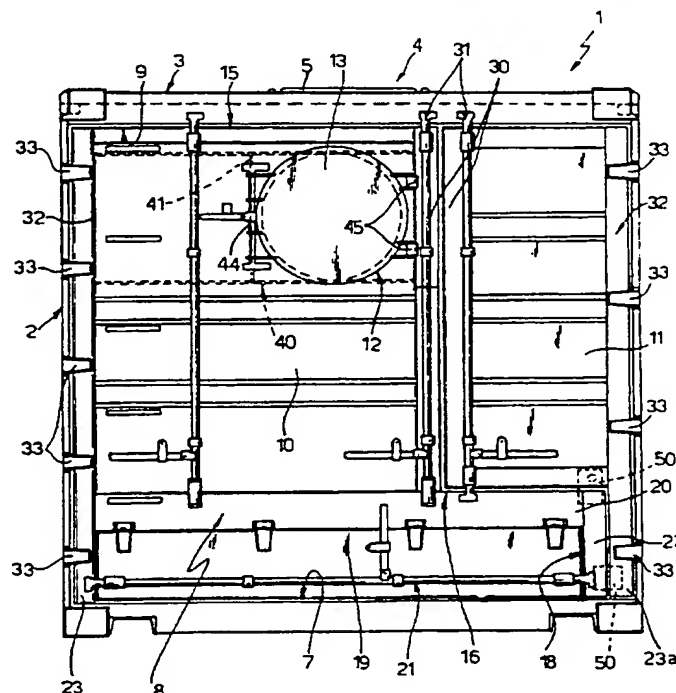
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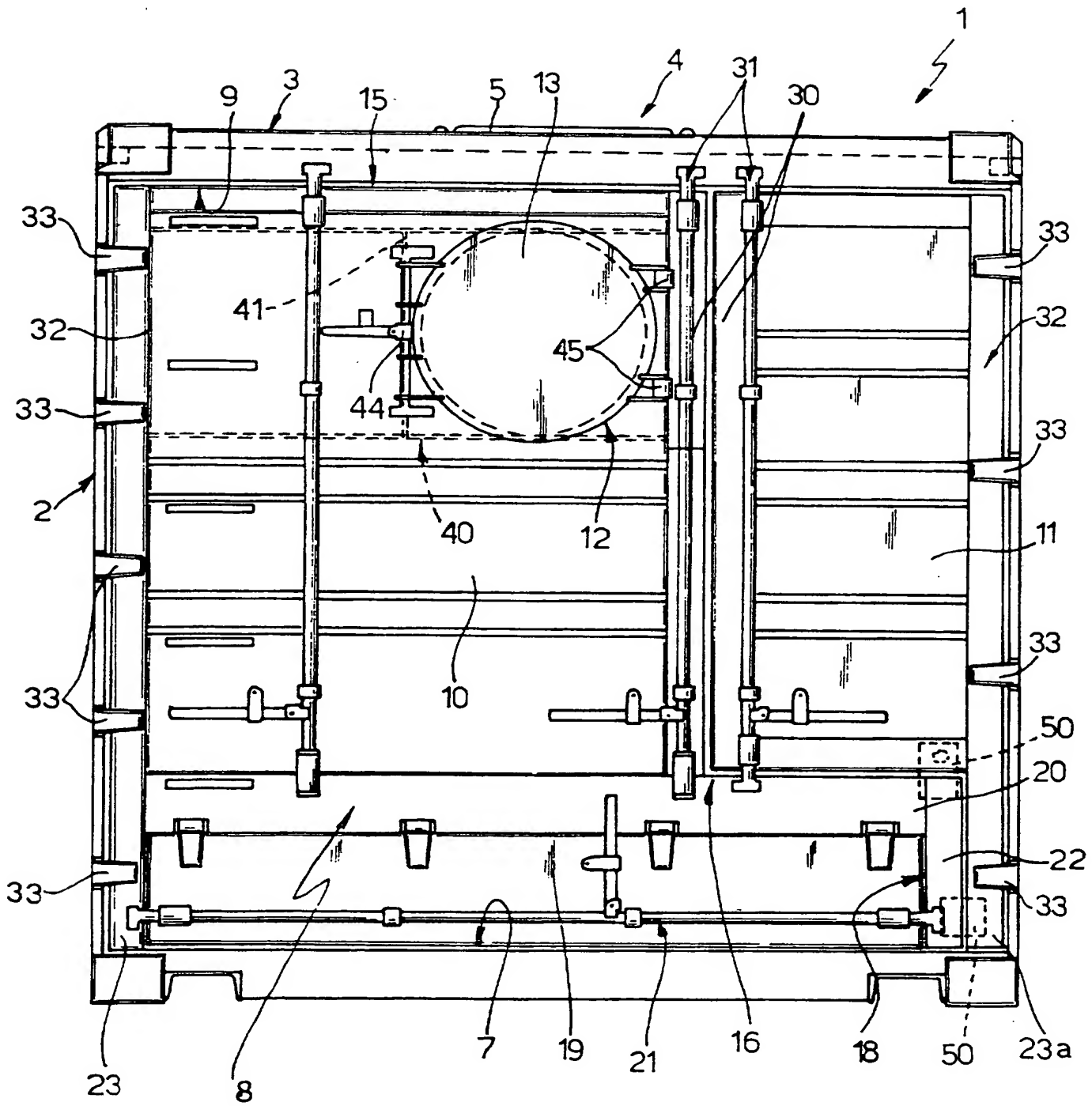
## (54) Transport containers

(57) A container (1) used for transporting loose solid goods (powders, granules etc.) comprises a substantially parallelepipedal casing with a metal structure, having a roof (3) with a series of hatches (5) for top loading and an open end defining a door opening (9) fitted with double doors (10, 11); the doors are of asymmetric widths and the wider one (10) has a horizontal loading hatch (13) which is close to an upper edge of the door so as to be positioned adjacent the roof (3) when the door is closed; the horizontal loading hatch (13) is suitable to allow the horizontal loading of the container (1) by a pneumatic conveyor system; along a lower edge (16) of the door is a horizontal discharge slot (18) which extends substantially the entire width of the door and which is closed by at least one pivoted panel (19), the latter being hinged to one of the doors (10).



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IMPROVEMENTS IN MEANS FOR LOADING A CONTAINER FOR  
TRANSPORTING LOOSE SOLID GOODS

5     The present invention concerns improvements in means for  
loading a container for transporting loose, solid goods  
such as powders or granules. In particular, the  
invention relates to a container which can be loaded and  
unloaded by means of any known system without ever having  
10    to be removed from the transport means on which it is  
carried (for example a lorry trailer, truck etc.).

So-called "bulk" containers are known which are used in  
conjunction with a large, internal sack for transporting  
15    loose, solid material, in particular polymers for the  
chemical industry. Such containers were originally  
loaded by pneumatic conveyor and unloaded under gravity  
by tipping, always through the usual door defining one  
end, a sack-retaining frame being installed internally,  
20    facing the door. Loading was subsequently effected from  
above, through suitable hatches in the container roof,  
the container being positioned below the silos full of  
material to be loaded and the material being dropped  
thereinto; as for unloading, these containers had a slot-  
25    shaped opening, known as a "letter-box", in line with the  
floor, the opening being closed by a pivoted shutter,  
usually pivoted about a horizontal axis and, preferably  
integral with the doors; in this way the door remains

closed throughout the loading and unloading operations, thereby reducing obstruction and greatly facilitating the aforesaid operations.

5 More recently however, pneumatic conveyor systems have become of interest for loading since they allow the horizontal container to be loaded while horizontal and without the need to position it below the silo. In addition, the loading which is achieved by horizontal  
10 pneumatic systems is superior to that obtainable by top-loading under gravity. On the other hand, the return to the old system of opening the doors to effect the loading involves operations of a certain difficulty, requires the use of sack-retaining frames which are costly and take up  
15 space within the container thereby reducing the load capacity, and is, moreover, an awkward operation.

The object of the invention is to improve the means for loading a "bulk" container by overcoming the disadvantages  
20 described above. In particular, the aim of the invention is to provide a container for loose solids, such as granular polymers, which can be loaded conveniently and rapidly by any known equipment, in particular under gravity from above or by pneumatic conveyor systems, and  
25 which at the same time guarantees reduced use of space and greater manoeuvrability.

The invention therefore provides a container for

transporting loose solid goods, such as powders or granules, comprising a substantially parallelepipedal casing of metal construction defining an internal load space, the casing comprising a roof having a series of loading hatches with associated hatch covers for allowing the top-loading of the load space under gravity, and an open end defining an access opening to the load space which has double doors; characterised in that the said doors are of asymmetric widths, and in that a first door, of greater width, has an integral horizontal loading hatch with an associated hatch cover, this hatch being close to an upper edge of the door so as to be positioned immediately adjacent the roof when the door is closed; the horizontal loading hatch being so dimensioned as to enable the load space to be horizontally loaded therethrough from outside the container by a pneumatic conveyor system, while allowing the simultaneous observation of the load space.

In addition, a horizontal slot-shaped discharge opening is defined along a lower edge of the door, extending substantially the entire width of the door and closed by at least one pivoted panel, hinged to one of the said doors.

In this way, both a traditional "letter-box" discharge opening, and a horizontal hatch, are incorporated in the closure device of the door opening, the hatch having

dimensions sufficient (due to the fact that it is made in a door of greater width) not only to enable the introduction of the loading end of a pneumatic conveyor system into the load space when the rear doors are closed, but also to enable the inside of the load space to be observed from the outside throughout the entire loading operation. It is therefore no longer necessary to open the doors (with the consequent need to provide a retaining frame for any sack located in the load space to contain the transported product) to effect the loading by pneumatic conveyor, while the option of top loading under gravity through the roof hatches is retained. In addition, all of these operations, plus the unloading operation, can be effected without the container ever being removed from the transport means on which it is mounted, with the simple precaution of always leaving the open end of the casing facing away from the driving cabin of the transporter.

Finally it should be noted that the presence of a horizontal hatch, especially of fairly large dimensions, to enable the operators to monitor the loading of the load space should, in the general view of experts in the art, greatly weaken the door structure so as to render it unusable. This problem is however avoided in the container according to the invention by the provision of this hatch in a door which is not only of increased width but is also formed simultaneously and integrally with the



entire letter-box discharge device. This combination, besides being more convenient in use in that all the equipment for the loading and unloading of the load space is gathered at one end of the container, surprisingly  
5 allows a door of sufficient rigidity to support the presence of the horizontal loading hatch without any disadvantages and, at the same time, enables a proper seal to be obtained when the door is closed.

10 Further characteristics and advantages of the invention will become clear from the following description of a non-limitative example of one embodiment with reference to the accompanying drawing, which is a front elevational view of a container according to the invention.

15 With reference to the aforesaid drawing, reference numeral 1 generally indicates a container adapted, in conjunction with the use of an internally mounted known sack (not illustrated for simplicity), to transport loose  
20 solid materials such as powders or granules, in particular chemical polymers.

The container 1 is constituted essentially by a substantially parallelepipedal (or rectangular-box-shaped) casing 2 of metal construction defining an  
25 internal load space provided, if necessary, with the aforesaid sack; the casing 2 comprises a roof 3 having a series of known loading hatches 4 with associated hatch

covers 5 suitable for the top loading of the load space under gravity, a floor 7 and an open end 8, which is, in fact, that illustrated in the drawing, which defines a substantially rectangular access opening 9 to the load space, which is substantially as wide and high as the load space itself.

The access opening 9 has double doors, indicated 10 and 11, of asymmetric widths across the casing 2, the door 10 being wider than the door 11; according to the invention, the door 10 has, in addition, an integral horizontal loading hatch 12 with an associated hatch cover 13; in particular, the hatch 12 is close to an upper edge 15 of the door 10 such that, when the door is closed, it is positioned immediately adjacent the roof 3; in addition the loading hatch 12 is made in such dimensions that it can be used to allow the load space to be loaded horizontally through it by means of a pneumatic conveyor located outside the container, at the same time allowing the operator to observe the load space to monitor the progress of the loading operation.

Furthermore, along a lower edge 16 opposite the upper edge 15 is a so-called "letter-box" discharge device comprising a horizontal slot-shaped discharge aperture 18 which extends along substantially the entire width of the door in line with the floor 7 and which is closed by at least one pivoted panel 19 hinged to one of the doors 10,

11. In accordance with the invention, the "letter-box" device is entirely integral with the door 10 which is also provided with the hatch 12 so that the door 10 is L-shaped in elevation since it incorporates the slot 18  
5 along the edge 16 and also the panel 19.

In this particular case, the lower edge of the door 10 is formed by an overturned L-shaped structural member 20 which projects from this door 10 below the rear door 11,  
10 thereby delimiting the lower edge of the discharge opening 18 along the floor; the closure panel 19 is hinged along its upper edge to the structural member 20, having an external known catch device 21, which is attached at one end to a vertical portion 22 of the  
15 structural member 20 and, at its opposite end, to a lower projection 23 of the door 10.

More particularly, the doors 10 and 11 are delimited vertically by respective first uprights 30 which are  
20 adjacent each other and have known devices 31 for locking the doors, and by respective second uprights 32 opposite the first uprights 31 and having associated hinges 33 for supporting the doors 10 and 11; the uprights 32 are longer than the doors 10 and 11 and, at their lower ends,  
25 form the projection 23 and an analogous projection 23a of the door 11, parallel to and adjacent the portion 22 of the structural member 20. The door 10 has more hinges 33 than the door 11.

The door 10 also has an internal framework constituted by an H-shaped frame 40 positioned in correspondence with the horizontal loading hatch 12 and anchored at its opposite ends to the uprights 30 and 32 of the door 10, the frame including a crosspiece 41; a known locking device 44 for the cover 13 is mounted on this crosspiece, on the outside of the door 10; the cover 13 is further provided with associated pivot hinges 45 which are supported by the associated upright 30 of the door 10. In this way all stresses which develop in correspondence with the hatch 12 are discharged onto the uprights 30 and 32 which are the most rigid parts of the door 10.

In order to increase the rigidity of the complex of the doors 10, 11 when the door opening 9 is closed, the door 10 is further provided, on its inner side, with respective plates 50, attached to the projecting part of the structural member 20, these plates being firmly fixed to the door 10 in positions such as to support the door 11 in abutment with them when the door opening 9 is closed. Thus, the opening 9 is closed by first closing the door 10 and then closing the further door 11 upon it so as to "imprison" the plates 50 behind this latter; consequently, the forces on the door 10, especially those on its lower, projecting part defined by the letter-box device, are discharged by the plates 50 onto the door 11 and from here to its upright 32 and its hinges 33.

Preferably, both the hatches 4 and the hatch 12 are integral with the roof 3 and the door 10 respectively, being formed on self-supporting panels the width of the container which form part of the supporting structure of the roof 3 and of the door 10 respectively, as described in UK Patent No. 2197639, corresponding to Italian Utility Model No. 208383 by the same applicant, the contents of which are incorporated here as necessary for ease of reference.

10

It will of course be understood that the present invention has been described above purely by way of example, and modifications of detail can be made within the scope of the invention.

15 In the appended claims, the reference numerals have been included to assist the reader in identifying the component parts of the container claimed, and are in no way intended to limit the scope of the claims.

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## CLAIMS

1. A container (1) for transporting loose solid goods, such as powders or granules, comprising a substantially  
5 parallelepipedal casing (2) of metal construction defining an internal load space, the casing comprising a roof (3) having a series of loading hatches (4) with associated hatch covers (5) for allowing the top-loading of the load space under gravity, and an open end (8) defining an  
10 access opening (9) to the load space which has double doors (10, 11); characterised in that the doors (10, 11) are of asymmetric widths, and in that a first door (10), of greater width, has an integral horizontal loading hatch (12) with an associated hatch cover (13), this  
15 hatch being close to an upper edge (15) of the door so as to be positioned immediately adjacent the roof (3) when the door is closed; the horizontal loading hatch (12) being so dimensioned as to enable the load space to be loaded horizontally therethrough from outside the  
20 container (1) by a pneumatic conveyor system, while allowing the simultaneous observation of the load space.

2. A container (1) according to Claim 1, characterised in that, along a lower edge (16) of the door, there is a  
25 horizontal slot-shaped discharge aperture (18) which extends substantially the entire width of the door and is closed by at least one pivoted panel (19) which is hinged to one of the said doors (10).

3. A container according to Claim 2, characterised in that the said doors (10, 11) are delimited vertically by respective first uprights (30) which are adjacent each other and have devices (31) for locking the doors, and by  
5 respective second uprights (32), opposite the first uprights and having associated hinges (33) for supporting the doors; the first door (10) having a greater number of hinges (33) than the other door (11).

10 4. A container (1) according to Claim 3, characterised in that the first door (10) includes a framework constituted by an H-shaped frame (40) positioned in correspondence with the horizontal loading hatch (12) and attached at opposite ends to the first and second  
15 uprights (30, 32) of the first door (10); the said frame (40) including a transverse element (41) on which a locking device (44) for the cover (13) of the horizontal hatch (12) is mounted on the first door (10), this hatch also having associated pivot hinges (45) carried by the  
20 first upright (30) of the door.

5. A container (1) according to any one of Claims 2 to 4, characterised in that the first door (10) is L-shape in elevation in that it incorporates the horizontal  
25 discharge slot (18) and the associated pivoted closure panel (19) integral therewith; the lower part of the first door (10) being delimited by an overturned L-shaped structural member (20) which projects from the door (10)

below the other door (11), in line with the floor and thereby delimiting the discharge aperture (18), the panel (19) for closing the discharge aperture being hinged along its upper edge to the said structural member (20).

5

6. A container (1) according to Claim 5, characterised in that the first door (10) is provided on its inner side, on the projecting part of the structural member (20), with respective plates (50) positioned so as to be able to support the other door (11) in abutment against them when the door opening is closed.

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7. A container (1) for the transportation of loose solid goods such as powders or granules, substantially as described with reference to and/or as illustrated in the accompanying drawing.

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**Patents Act 1977**  
**Examiner's report to the Comptroller under Section 17**  
**(The Search report)**

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 GB 9519877.6

**Relevant Technical Fields**

- (i) UK Cl (Ed.N)      B8P (PG2, PL7, PK7)
- (ii) Int Cl (Ed.6)      B65D 88/12, 88/54, 88/56, 90/00.  
                                 B60J 5/00, 5/10

Search Examiner  
 MIKE HENDERSON

Date of completion of Search  
 22 NOVEMBER 1995

**Databases (see below)**

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

Documents considered relevant following a search in respect of Claims :-  
 1-7

(ii) ONLINE: WPI

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